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REVIEW

Revision of surgical treatment of rhinosinusitis

Gonzalo Martín-Hernández,* Teresa Collazo Lorduy, Maria Jesús Velasco García, Javier Gavilanes Plasencia, Juan Luis Sánchez-Jara Sánchez

Servicio de Otorrinolaringología, Complejo Asistencial de Ávila, Ávila, Spain

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KEYWORDS
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Abstract The aim of this revision paper is to provide an update of available resources to achieve the best endoscopic sinus surgery outcomes of adult rhinosinusitis.

The cause and mechanisms of rhinosinusitis remain unknown, and curative treatment does not exist. Recent new insights into paranasal sinus pathophysiology, along with technical advances in imaging and endoscopy, have revolutionised surgical treatment of rhinosinusitis.

Since an increasing number of patients undergo functional endoscopic sinus surgery as a therapeutic regimen for their disease, appropriate use of computed tomography is critical in providing a "roadmap" for the surgeon to delimit the surgical procedure, as well as to ensure safety and accuracy. With proper training and technique, endoscopic surgery is quite safe, but prevention and management of complications must be known.

PALABRAS CLAVE
Cirugía endoscópica nasosinusal;
Rinosinusitis;
Poliposis;
Complicaciones

Revisión del tratamiento quirúrgico de la rinosinusitis

Resumen Este artículo de revisión tiene por objeto la actualización integral de los aspectos que permiten obtener el máximo rendimiento del tratamiento quirúrgico endoscópico de la rinosinusitis del adulto.

El desconocimiento del origen y mecanismo de producción de la rinosinusitis hace que no exista aún un tratamiento curativo. Los más recientes hallazgos en la fisiopatología de los senos paranasales, junto con los avances endoscópicos y radiológicos, han revolucionado el tratamiento quirúrgico de la rinosinusitis.

Existe un elevado número de pacientes a los que se realiza cirugía endoscópica nasosinusal funcional. El uso apropiado de la tomografía computarizada es fundamental para que el cirujano obtenga las referencias necesarias y pueda planificar el procedimiento con precisión y seguridad.

*Corresponding author.
E-mail address: gmartinh@saludcastillayleon.es (G. Martín-Hernández).

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La cirugía endoscópica nasosinusal es una técnica segura si se realiza con una técnica adecuada y el suficiente entrenamiento, pero deben tenerse en cuenta los recursos necesarios para la prevención y tratamiento de complicaciones.

Introduction

The optimal treatment for rhinosinusitis (RS) is that which eliminates symptoms, eradicates predisposing factors and preserves the sinus function, causing the minimum morbidity and cosmetic deformity.

The lack of knowledge about the exact pathogenesis of RS means that entities of different origin receive identical treatment. The existence of a bacterial biofilm in the sinonasal mucosa could explain the frequent lack of response towards medical treatment. These are bacterial groups surrounded by a film with extracellular glycoprotein polymer. Its peculiar organisation allows for genetic exchanges and favours resistance towards antibiotic treatment.[1]

When medical treatment does not manage to control RS, functional endoscopic sinus surgery (FESS) is the surgical treatment of choice, with some exceptions. We will now describe the most important aspects of its application.

Radiological references

The development of FESS has been linked to advances in CT imaging. Apart from its usefulness for diagnosis, it also allows planning the surgical treatment (Table 1).[2] Software for a virtual endoscopy and 3D reconstructions lacks any diagnostic value, although it does have some educational uses. MRI imaging is not generally used, as its main application is for the study of tumours in that region.

Coronal sections define the sinonasal anatomy, offering a surgical perspective with many references. The location of the anterior ethmoid artery must be added, at the classic height of the cribriform plate. This artery is identified as an indentation in the superior medial orbit when the upper oblique muscle is visualised. Although 65% of the ethmoid artery is a continuation of the ethmoid bulla, 35%of it is located at a mesentery, which is susceptible of being damaged during the suprabullar recess. The ideal way to explore this area is through parasagittal sections (Figure 1).

The insertion of the uncinate process in the skull base or in the anterior portion of the middle turbinate conditions the drainage of the frontal recess lateral to the process, while its insertion in the lamina papyracea of the orbit enables the medial recess to the process to be found. Coronal sections also make it possible to detect Haller cells in the medial wall of the maxillary sinus and to thus evaluate the height of the posterior ethmoid and its relation with the sphenoid.

The frontal sinus will allow us to locate the following cells (Figure 2):

- Agger nasi cell.
- Supraorbital cell.
- Frontal cells (Kuhn classification[3]) (Table 2).
- Suprabullar cell.
- Interfrontal septum cell.

The existence of horizontal septa in the sphenoid sinus should lead us to think of invasion by posterior ethmoid cells. The elimination of such septa does not have any consequences (Figure 3), as opposed to the intersinus septum, which is frequently inserted into the internal carotid artery wall.[4]

Table 1 Radiological references

Coronal sections	
Cribriform plate	*Height*
Uncinate process	Insertion: • Skull base • Middle turbinate • Lamina papyracea
Anterior ethmoidal artery	
Posterior ethmoid	Height Relationship with sphenoid
Medial wall of maxillary sinus	Haller cells Accessory ostium
Sphenoid sinus	Relationship with optic nerve Relationship with internal carotid artery
Frontal sinus	Agger nasi cell Supraorbital cell Frontal cells Suprabullar cell Interfrontal septum cell
Axial sections	
Posterior ethmoid	Relationship with optic nerve (Onodi)
Frontal sinus	Distance olfactory fossa-nasofrontal apophysis
Sphenoid sinus	Pneumatization of sphenoid rostrum
Parasagittal sections	
Frontal sinus	Size of frontal recess
Ethmoid bulla	Presence of suprabullar recess
Anterior ethmoid	Distance superior side of middle turbinate or ethmoidal roof

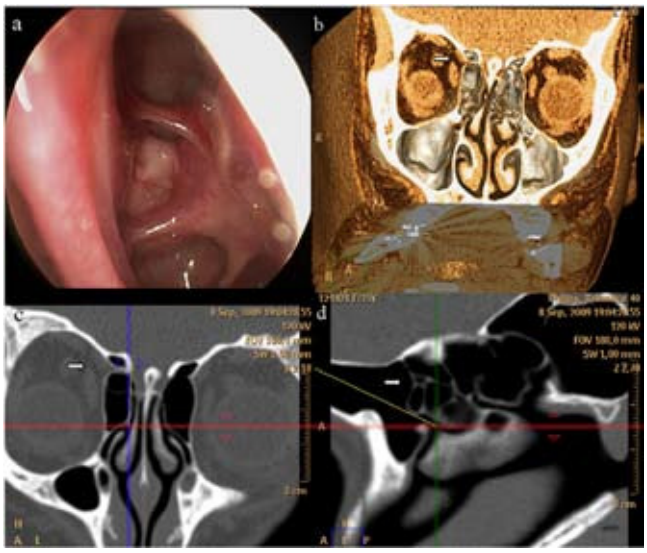

Figure 1 Right anterior ethmoid artery (arrow).

a. Endoscopic image.
b. Three-dimensional reconstruction.
c. CT, coronal section at the height of superior oblique muscle.
d. Parasagittal reconstruction enabling a view of the relationship with the ethmoidal bulla.

Table 2 Frontal cells

Type I	A single frontal recess above the agger nasi cell
Type II	A group of cells above the agger nasi, projecting into the frontal recess
Type III	A massive cell above the agger nasi, with cephalic pneumatization towards the frontal
Type IV	A cell within the frontal sinus. Difficult to see due to the thinness of its walls

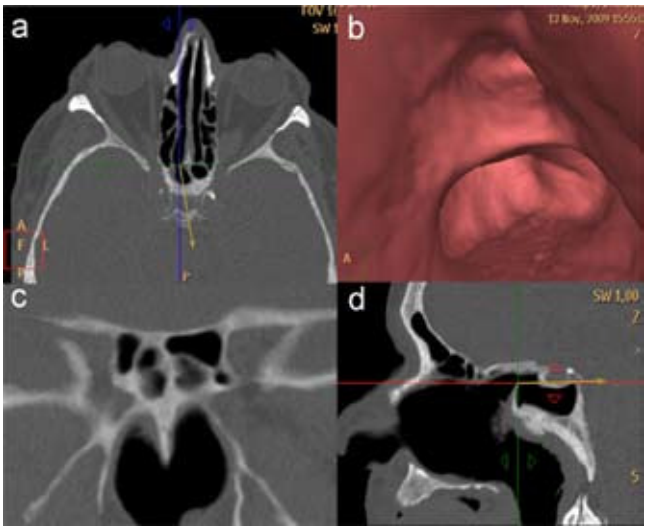

Figure 3 Horizontal intrasphenoid septum visible in endoscopic reconstruction software (b) and in coronal CT (c). This finding is related to the existence of sphenoid invasion by posterior ethmoid cells.

The most relevant features in the axial sections are the relationship between the posterior ethmoid and the optic nerve, the distance between the nasofrontal process and the olfactory fossa, and the detection of hyperpneumatization in the sphenoid rostrum (Figure 4). In this last case, a distinction should be made between tumours and pneumocephalus. Although the clinical signs and symptoms of sphenoid RS are insidious and delayed diagnoses are the norm, the proliferation of chance findings in radiological tests made to study migraines and other diseases has increased the number of cases of isolated sphenoid RS.[5]

Parasagittal sections improve the preoperative information for the surgeon when accessing the frontal recess. They also modify the surgical planning in more than half of the cases.[6]

The distance between the upper side of the middle turbinate and the top of the ethmoid has recently been described as a reference of interest. This is because the risk of cerebrospinal fluid (CSF) fistula increases when this distance is less than 6mm, due to the proximity to the cribriform plate (Figure 5).[7]

Figure 2 Cells related to frontal sinus access.

a. Agger nasi cell. Coronal CT (arrow).
b. Supraorbital cell. Coronal CT (arrow).
c. Frontal cells (Kuhn Type II). Coronal CT (arrow).
d. Interfrontal septum cell. Coronal CT (arrow).

Indications for surgical techniques

It is important to adapt the surgical technique to the necessities of each case, without generalising its

Figure 4 Axial CT sections.

a. Distance between olfactory fossa and anterior wall of frontal sinus (asterisk).
b. Relationship of posterior ethmoid cells with the optic nerve (asterisk).
c. Hyperpneumatization of the sphenoid rostrum (asterisk).
d. Isolated sphenoid sinusitis. Distinguishing between tumours and infected encephaloceles.

application. The peculiarities of each case (acute, chronic, complication) must be taken into account along with the pattern of pneumatization, the needs for exposure of the surgical field and the experience of the surgeon.

To study the results obtained and to establish improvement measures, we incorporated perioperative evaluation systems, such as the *Sinus Symptom Questionnaire* by Lund-McKay,[8] and endoscopic scale evaluations, such as the *Lund-Kennedy Endoscopic Score*.[9] Rhinometry, rhinomanometry and olfactometry studies should also be added to the evaluation scales.

Figure 5 If the distance between the upper face of the middle turbinate and the ethmoid roof is less than 6 mm, the risk of CSF fistula by instrument manipulation is considered high.

Figure 6 Coronal CT sections with bone window.

a. Neoosteogenesis after endoscopic sinus surgery (Draf Type II) in left frontal sinus (asterisk). Frontal mucocele and continuity solution in frontal bottom with subperiosteal abscess.
b. Permeable frontal ostium after left frontoethmoidectomy (modified Lynch approach and tutoring 4 weeks) (asterisk).

We consider FESS to be functional when the natural drainage routes are preserved, as well as the sinonasal anatomical structures. Functional FESS is recommended in cases of primary surgery when there is a lack of response to medical treatment and intolerance to corticosteroid treatment. In case of review surgery, fungal RS (fungal ball or invasive fungal sinusitis) or complicated RS, a FESS with nasalization of the sinus cavities is recommended. In this case, to the goal is achieving a wide sinonasal communication.

External approaches are limited to cases of frontal sinus RS in which the visualisation needs to be greater than what is offered by the endoscopic approach, because of scarcely pneumatized cases or of complications. An osteoplastic flap procedure will frequently cause aesthetic alternations, supraorbital neuralgia and other complications. As a result, 85% of frontal RS benefit from endonasal surgical approaches, versus 15% of external approaches (Figure 6).[10] Frontal sinus trephination can avoid open techniques in cases of review or when the usually available references are missing. Stankiewicz and Wachter obtained success rates of 90% with endoscopic approaches in patients in whom osteoplastic approaches had failed (Table 3).[11]

The FESS technique has proven to be more effective than other techniques, such as polypectomy, irrigation and open techniques. This is true even in cases with higher intervention rates such as intolerance towards salicylic acid and cystic fibrosis.[12]

Instrumentation

The use of a 0° endoscope simplifies surgery, decreasing damage to surrounding mucous membranes and limiting the risk of disorientation of angled endoscopes. If the endoscope is angled, it is recommended that instruments

Table 3 Indications of the modified Lothrop technique

Indications	Failure of prior FESS. Frontal RS with a Kuhn type 4 cell, not resolved with FESS
	Neoosteogenesis of the frontal recess. Adherences in the frontal recess by lateralization of the residual middle turbinate after prior surgery
	Failure of the approach with an osteoplastic flap, with formation of mucocele
Relative contraindications	Scarcely pneumatized frontal sinus
	Small anteroposterior diameter of the frontal sinus

have an angle too, so that the tip can be visualised in the centre of the image. The 0º endoscope can even be used in a frontal approach until the bottom is cleared; however, after this point, the use of a 30º endoscope becomes necessary.[13] If an endoscope irrigator is included, it is possible to avoid interruptions during surgery.

The microdebrider is a highly recommendable for FESS. The combination of aspiration-cut-rotation is perfectly adapted to the needs of this type of surgery:

- It minimises lesions and excoriations of healthy mucosa.
- It shortens the scarring period.
- It decreases the number of potential sequelae.

However, if the lamina papyracea is inadvertently crossed, damage to the orbit can occur within seconds. The most common is damage to the gracilis muscle.[14] In most cases, the oscillating option is chosen by default. Through the use of the pedal, the surgeon can modify rotation speed. This speed determines the quantity of tissue that is cut. The higher the speed, the lesser the tissue aspiration before the cut, yielding a less aggressive resection.

Straight and angled drilling terminals with incorporated aspiration complement the cutting terminals. These are reserved mainly for the frontal sinus approach. Some of the disadvantages of the previous models, such as the slow advance speed, have been corrected in the most recent versions.[15] There have been changes to the morphology at the tip, which can incorporate a protector for sensitive areas that can be adapted to the different stages of the procedure.

The use of a bipolar aspiration-coagulation forceps, or of a YAG laser, can decrease surgical bleeding.

In primary surgery, the neuronavigator has not been proven to improve the results obtained without its use. Furthermore, it cannot substitute the surgeon's experience and training. However, it is recommendable for use in frontal sinus review surgery. It can also be useful in identifying drainage orifices during FESS, as well as in limiting osteotomy margins in an osteoplastic flap approach.[16]

Endoscopic surgery sequence

Although there is consensus on the importance of avoiding interventions during acute inflammatory periods, there is no agreement on the systematic use of systemic preoperative patterns with corticosteroids. In the case of chronic polypoid RS, less intraoperative bleeding and shortening of mucosal healing time have been described by prescribing 30 mg of oral prednisone every 24 hours from the 5 days prior to the intervention to 9 days after it.[17]

To achieve sustained clinical remission, in addition to the sinonasal surgical drainage, we must treat other predisposing factors (associated pathologies, anatomical alternations, etc.).

Although the existence of concha bullosa is associated with sinus pathologies, in most cases the infection occurs in the contralateral side, when the septum is deviated towards that side. The type of concha bullosa is considered the most important factor. The lamellar form (the most common) is a normal anatomical variant. However, the expansive and bullous forms can cause cases of CRS due to sinus ventilation disturbances and mucociliary activity in the middle meatus. Consequently, an association between CRS and concha bullosa is frequently present in these cases (Figure 7).[18]

In well-selected cases, nothing can condition FESS as much as bleeding during surgery. Nasal instillation of medication with topical oxymetazoline at 1% some minutes before surgery, and cotton soaked in vasoconstrictor solutions after aesthetic induction (lidocaine at 2% with adrenaline 1:100,000), are standard practice. In some cases, infiltration of the most common bleeding points, such as the anterior insertion of middle turbinate, the sphenopalatine orifice and the anterior side of the sphenoid, below the ostium, is recommended.

The position of the patient also contributes to reduce bleeding. Recommended is an anti-Trendelemburg position with the head elevated 15º, as well as a slight elevation of the lower extremities.

Good rapport with the anaesthesiologist is another key factor to achieve a mean arterial pressure of 70 mmHg. Below this level, no correlation has been found between the level of hypotension and clearness of the surgical field.

Figure 7 Coronal CT sections with compression of middle meatus.

a. Paradoxical middle turbinate, with convexity toward the middle meatus (arrow).
b. Expansive concha bullosa (arrow).

It has been indicated that total intravenous anaesthesia with propofol perfusion does not affect the prearteriolar muscle tone or the precapillary sphincter, so it does not cause vasodilation, unlike inhaled agents.[19]

It is recommended to adapt the FESS sequence to the requirements of each case, but it almost always begins with the complete excision of the uncinate process. This manoeuvre is directly related to the absence of recurrences and lachrymal and orbital complications.[20] One of the cases with the highest risk of orbital alteration is silent sinus syndrome. In this case, the maxillary sinus is completely occupied, giving rise to the absorption of all the gas in the sinus. As a consequence, a negative pressure is created that impacts the uncinate process against the lateral nasal wall. If this situation persists, the orbit may expand, producing enophthalmos; this situation is known as "silent sinus syndrome" (Figure 8). In these cases, the anterior section of the uncinate has a high incidence orbital penetration rate.

In functional FESS, the opening of the natural ostium of the maxillary sinus is recommended once the uncinate process has been removed, but without communicating it with the accessory ostium. This is done by leaving an orifice no more than 5 mm in diameter, to avoid decreasing the concentration of intrasinus nitric oxide, which stimulates ciliary activity and inhibits infection.[21]

In cases with wide maxillary sinus polyps, in fungal RS or in cases of cystic fibrosis or intolerance to acetylsalicylic acid, it is a good idea to communicate the natural and the accessory ostia to favour postoperative washing.

Figure 8 Coronal CT section of silent maxillary sinus, in which maintained negative pressures lateralise the uncinate process and favour the orbital expansion, causing enophthalmos.

During ethmoidal surgery, the horizontal insertion of the middle turbinate makes it possible to identify the access to the posterior ethmoid. Lateral manipulations in this area, which could damage the optic nerve, should be avoided.

Preventing complications in frontal sinus treatment is based on the restriction of indications. It is relatively simple to cause frontal iatrogenic alterations in cases where a dysfunction did not previously exist. Laceration of the ostial mucosa, especially its lateral portion, favours its postoperative block.

Among the difficulties of the frontal sinus approach is the small diameter of the frontal recess, which makes visualisation in case of bleeding very difficult. Another difficulty is the unfavourable location of the optics, just below the area of bleeding.

The preoperative definition of the frontal recess is essential, locating the insertion of the uncinate process and defining the cells existing in the recess. Although the uncinate process has traditionally been considered the key to frontal recess access, the agger nasi cell is currently considered vital as well. This cell is present in almost all cases.[22] It can be identified in coronal sections, anterior to the middle turbinate. The uncinate process forms the medial and posterior walls of the agger nasi, which is why removing the upper part completely makes the rest of the surgery easier. Another reference to be taken into account is the front of the ethmoid bulla. Once this is removed, it is possible to see the outline of the anterior ethmoid artery. This location is aligned with the anterior cranial fossa.

If FESS is considered minimally invasive compared to the Caldwell Luc approach, ostium dilation with balloon catheter should be considered micro-minimally invasive, as it obtains the same results as FESS without the need to alter the structures surrounding the ostium. This process has evolved from requiring radioscopic control to being performed with only an endoscopy. It can be used as a minimally invasive process in cases of isolated sinus dysfunction and in a hybrid manner with FESS, performing the ethmoidectomy in a conventional manner and the dilation of the frontal recess with a balloon. It presents very few complications, although it is very costly.[23]

The modified Lothrop approach makes it possible to avoid open approaches in most frontal RS. The location of the first olfactory branch after the mucous incision in inverted "V" of the nasal roof mucosa, at the height of the head of the middle turbinate, is a reference for the location of the anterior cranial fossa. The difficulty in joining both frontal sinuses comes from the fact that the olfactory fossa describes an anterior prolapse resembling the prow of a ship, which must be followed, attempting to extend beyond the anterior bone region of the nasofrontal apophysis. The result should be a cavity of more than 18mm in the anteroposterior direction and of 20-24mm laterally, since a tendency towards stenosis is the norm. It is also essential to remove the interfrontal septum extensively in its lower portion (Figure 9).

Although access to the sphenoid sinus can be transethmoidal, the transnasal route requires less surgical time and presents lower morbidity.

If the sphenoid ostium is not identified 10-12 mm above the upper edge of the choana, 1/3 of the lower part of the upper turbinate insertion can be removed.[24] Once identified,

Figure 9 Postoperative image of bilateral endoscopic sinusotomy of the frontal sinus (modified Lothrop), one month (a) and 6 months (b) after surgery. The trend at the closure of the opening created requires an anterior opening to the first olfactory fibre and between the lamina papyracea of both orbits.

it is extended in the inferior and medial directions. The use of chisels should be avoided in this area, since they can cause intracranial fractures at a distance.

The number of haemorrhages, formation of crusts and septal-turbinate synechiae must be kept at a minimum during the postoperative period. To achieve this, it is necessary to use mucous flaps during interventions and to be very careful during manoeuvres so as to not cause unnecessary friction.

The use of haemostatic solutions such as FloSeal® during surgery may favour postoperative adhesions. There have been no benefits proven from the use of mitomycin C, hyaluronic acid or retinoic acid in preventing synechiae and adhesions.[25] Although resorbable nasal packing with carboxymethylcellulose (Rapid Rhino®) is comfortable for the patient, using such packings has not proven to produce a lower incidence of postoperative bleeding compared to non-resorbable ones, or the absence of nasal packings.[26]

Stabilising the middle turbinate at the end of endoscopic surgery is considered important to avoid the collapse of the middle meatus and recurrence. The lateral scarring strength is superior to that of the septal turbinate synechiae that may be obtained by scarring of the middle turbinate and septum. For this reason, the application of a septal turbinate transfixing point is suggested.

The postoperative endoscopic removal of crusts and secretions one week after the intervention improves local pain and congestive symptoms. However, the frequent repetition of this manoeuvre is uncomfortable for the patient and has not been proven to reduce the number of synechiae.[27]

Irrigation with saline solution is a constant within the therapeutic postoperative arsenal. Although, in theory, it improves mucociliary flow and hydrates mucous membranes, the ideal concentration has not yet been determined.[28] However, some hypertonic solutions may produce irritation in susceptible patients.

Treatment of FESS failures

The FESS technique has been proven to improve the signs and symptoms, as well as the quality of life of patients with CRS. However, approximately 10% of cases suffer clinical relapse, despite adequate technique. The labyrinthine sinus anatomy, under normal conditions, prevents the deposit of secretions in the paranasal sinuses; and it seems that FESS can alter or excessively stimulate immune mechanisms, causing changes in the sinonasal flora and physiology.[29]

Topical treatment reaches the sinus mucosa directly and prevents the adverse effects of oral treatments. However, it maintains a certain absorptive capacity and local toxicity, which must be taken into account.

Aside from nasal washing with saline solutions, topical corticosteroids are considered a first-choice treatment during postoperative RS, as they produce an inhibition of expression of the genes involved in the inflammatory process. Nevertheless, they should be used in the smallest possible dose, so as to avoid systemic effects. Applying corticosteroid drops in the supine position makes it easier for the treatment to reach the frontal recess and middle meatus.[30]

Antibiotic treatments, whether topical, oral or intravenous, should be reserved for short patterns, taking cultures when possible.[31] Long-term treatments with low-dose macrolides (erythromycin and derivatives) have an immunomodulatory effect, which seems greater in cases of neutrophilic infiltrate than in those with eosinophilic predominance, and have shown efficacy in cases of CRS.[32]

The most recent treatment strategies have the objective of eliminating the sinonasal bacterial biofilm. Systems are used that act on the biofilm matrix through mechanical or chemical means.

Irrigation with saline solutions does not affect biofilm structure, but the use of pulsating irrigation devices, such as those used to clean dental plaque (Water Pic), can contribute towards its elimination. Recently, mupirocin and some liquid soaps for children containing cocamidopropyl betaine have proved effective in eliminating *in vitro* *Staphylococcus aureus*.[33]

Intraoperative complications

The following risk factors for complications have been described[34]:

- Extent of involvement.
- Surgical review.
- Involvement of the right side.
- Local anaesthesia.
- Volume of bleeding during surgery.
- Lack of surgeon experience.

In the area of anterior insertion of the middle turbinate, the uncinate process is inserted directly into the maxillary ascending apophysis, above the lachrymal bone: consequently, direct incision may open the lamina papyracea and expose orbital fat if it comes too close to the insertion. This complication can be avoided by not performing the incision on the lateral limit. In many cases, previous dislocation with an angled curette, inserting it through the semilunar hiatus, facilitates the view. After that, removal is completed with Blakesley nasal forceps angled at 45° or retrograde forceps. Penetration into the lachrymal sac does not usually have consequences other than scarring stenosis.

In case of anterior ethmoidal artery haemorrhage, after the previous compression, cauterisation should be bipolar if it is near the skull base, given that the monopolar system may produce a cerebrospinal fluid (CSF) leak. If this is ineffective, the use of FloSeal®[35] can be a possibility. In case a rapid orbital haematoma is identified, the external canthal ligament should be sectioned to decompress the orbit, and then an arterial haemostasis should be performed. The alternative to an endoscopic approach is ligation of the exterior ethmoidal artery between the orbit and the lamina papyracea.

Both the bleeding of the sphenopalatine artery and of its septal branch below the sphenoid ostium can be controlled with bipolar forceps. If a haemorrhage of the internal carotid artery takes place inside the sphenoid sinus, this can represent a potentially lethal complication. It requires perfusion of plasma expanders and visualisation is not possible using endoscopic instruments. Frontal illumination is recommended, as well as exploration with a Killian speculum, attempting to achieve a nasal blocking, introducing it in the sphenoid sinus. Subsequently, the collaboration of a neurosurgeon will be required, as well as that of a vascular surgeon and an interventional radiologist.

The incidence rate of iatrogenic CSF leaks during FESS is of 0.9%; cases with hidden fistula after FESS have almost disappeared after the introduction of more functional techniques. If a fistula is identified during an intervention, the mucoperiosteum is separated until the surrounding bone is exposed and a flap is put in place. This flap can be obtained from septal or bone mucoperichondrium and mucoperiosteum of the middle turbinate. Placement can be extracranial (overlay) or combining intra- and extracranial techniques (underlay and overlay). After surgery, resting in bed for 2 days is recommended. The non-compressive sphenoethmoidal nasal blocking is removed on the next day. Patients are discharged after 3-5 days of observation, and should rest at home for 3 more weeks.[36] In posterior ethmoid and sphenoid fistulas, a nasal septal flap pedicled to the upper edge of the choana and dependent on the posterior nasal artery may be useful.[37] Another option consists of using a flap pedicled to the middle turbinate and dependent on the sphenopalatine artery.

Conclusions

The incorporation of clinical surveys and perioperative endoscopies contributes, along with the treatment of predisposing factors, to adequate surgical indications and evaluation of results. It also makes improvement actions in the treatment of RS possible.

The recent increase in precision that CT technology has experienced has made a detailed preoperative study with the required reconstructions mandatory. This information is decisive in reducing recurrences and complications. This topic is very relevant because complications, even if rare, are less understandable in the treatment of a benign inflammatory pathology.

A precise indication and adequate training adapted to the findings in each case are the basic premises to carry out a FESS that can resolve most of the cases intervened.

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